V1740 standard firmware with decimation

CAEN S.p.A., December 2013

Introduction

The decimation is enabled writing the 0x8044 register. The decimation value corresponds to 2^n, where n is the value written in the register. Allowed values range from 0 to 7.

The corresponding sampling frequency changes with the formula:

$$Freq = 62.5 / (2^n) \text{ MHz, where } n = [0,\ldots, 7]$$

NOTE: please, be aware that the current CAEN software WaveDump does not take into account the decimation yet. If you do the test with WaveDump the values of record length and post-trigger are not correct.

This is because the value of record length is written in samples of the sampling frequency, and the software does not recognize that the sampling frequency has changed. The post-trigger value is then written in percentage of the record length value.

Considering those two issue, we checked the right behavior of the decimation firmware with WaveDump as well (see next section).

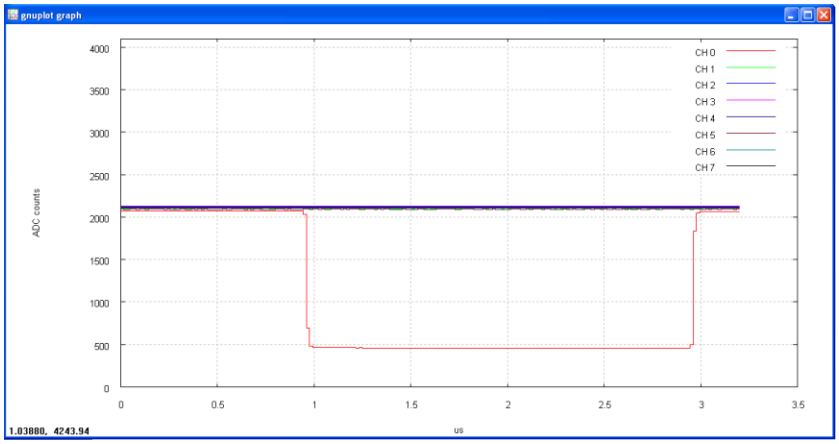
Test instructions

1. Upgrade the V1740 firmware to the v1740_DB240402_DC160007.rbf (in attachment). Please, use the CAENUpgrader tool downloadable from CAEN web site.

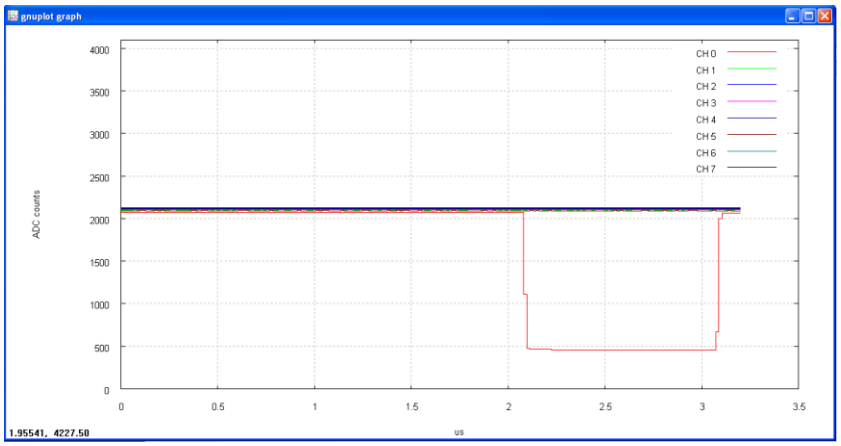
2. We did a test with a NIM pulse (800 mV height), 2 us width, 1 KHz frequency.

3. We enabled channel 0, and we set a threshold of 1800 counts, 200 samples of record length (see the attached WaveDumpConfig.txt).

4. In the config file the decimation is not yet enabled. The corresponding plot is as follows.



5. Enable the decimation with value = 1, i.e. write
   WRITE_REGISTER 8044 0001
   The sampling frequency is divided by two.
   The data acquisition should change as:



   As explained before, the software does not recognize the decimation yet, therefore the record length appear as before, but it has to be multiplied by two.
   The post-trigger as well is evaluated with respect to the record length.

6. Write a decimation value of 6, i.e. the sampling frequency is $62.5/(2^6) = 0.97$ MHz
   The corresponding plot is: